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charged from time to time, as may be necessary, by means of a dynamo.

In each case the electric lamp is fitted to the end of a small wooden cylinder of the same size as the oil lamp previously used. This cylinder takes the place of the oil lamp in the apparatus attached to the micrometer, no change in this being made. Wires run from the lamp through the cylinder to a switch within easy reach of the observer at the eye-end of the telescope. The wires from the battery are brought up to the pier, where a cable is attached of sufficient length to reach any part of the dome. A plug at the end of the cable completes the circuit at the switch.

This arrangement is very satisfactory, and it has decided advantages over oil illumination. It is perfectly under control, any degree of illumination of the wires being easily obtained. It may be instantly extinguished by turning the switch or by withdrawing the plug, and as readily turned on. It is not affected by wind and there is no dripping oil. It may be completely covered up, preventing the escape of extraneous light, which is especially desirable in observing exceedingly faint objects. And it takes but a moment to change to the oil lamp in the case of emergency.

W. J. HUSSEY.

THE LOWELL OBSERVATORY CATALOGUE OF DOUBLE STARS.

A most important contribution to double-star astronomy is Dr. T. J. J. SEE'S catalogue of "Discoveries and Measures of Double and Multiple Stars in the Southern Heavens," recently published in the *Astronomical Journal.* The catalogue contains the positions for 1900.0, and measures of the position-angle and distance of 500 new stars between the limits 20° and 65° South Declination, which were found by Dr. SEE and Mr. COGSHALL with the 24-inch telescope of the Lowell Observatory during the sixteen months ending December 31, 1897. The components of 122 of the stars are separated by less than 1″, and in many of the wider pairs one component is very faint. With respect to the proportion of close and difficult stars contained, the list therefore takes a high rank. In the course of the work, 500 stars previously known were measured also,* and, Dr. SEE states, more than 100,000 stars were carefully examined.

It is to be regretted that the magnitude of the undertaking

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*Measures to be published later in *A. N.*

prevented the carrying out of the original plan of measuring each star on three different nights. Nearly three-fifths of the number were passed with two observations made on one night only and by one observer only. One fears that the positions resulting from such measures, though "made in a manner as independent as possible," will not be sufficiently reliable to make it certain that differences between these and future measures are due to motion in the stars. For, as noted above, many of the stars are difficult, and the catalogue contains a number of instances of discordances in the measure of a star by the same observer on different nights, amounting in some cases to from 1″ to 3″ in a mean distance of 8″ or less, and occasionally to 10°, and even more, in position angle. We must also acknowledge that we cannot understand why some discordant measures are rejected (e. g. λ_1 42, λ_1 112), while others, equally discordant (e. g. λ_1 76, λ_1 170) are given full weight.

It is to be hoped that Dr. SEE may soon find time — even at the cost of delaying the completion of his survey of the southern heavens — to recur to the more promising of those stars in the present catalogue which were measured on one night only, and, by additional measures, place the present position of the components beyond doubt; for it is highly probable that a number of these stars will show rapid motion. R. G. AITKEN.

CHANGES IN THE AMERICAN EPHEMERIS.

In the preface to the American Ephemeris for 1900, just received, Professor HARKNESS states that certain changes of importance have been introduced in the volume. "First, the constant of precession for the epoch 1900.0 has been changed from 50″ 2638 to 50″.2482; the constant of nutation for the same epoch has been changed from 9″.2231 to 9″.21; the constant of aberration has been changed from 20″.4451 to 20″.47; and the constant of solar parallax from 8″.848 to 8″.80. Second, Professor NEWCOMB'S tables of the Sun, *Mercury* and *Venus*, and Dr. HILL'S final printed (as distinguished from his provisional manuscript) tables of *Saturn* have been substituted for the tables which were formerly used. Third, the 175 additional fixed stars, whose apparent Right Ascensions only were heretofore given, have been transferred to the regular list, which now contains their complete apparent places throughout the year."

The volume, it seems, was prepared entirely under Professor NEWCOMB'S supervision, before his retirement in 1897.